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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,749	02/18/2004	Yoshihiro Kimura	H6808.0040/P040	2045

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EXAMINER	
JOHNSTON, PHILLIP A	

ART UNIT	PAPER NUMBER
2881	

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02/18/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/779,749	KIMURA ET AL.	
	Examiner	Art Unit	
	PHILLIP A. JOHNSTON	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 January 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-18* is/are rejected.

7)☒ Claim(s) *12-18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *2-18-2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

1. This Office Action is submitted in response to the amendment filed 1-15-2010, wherein claims 1-11 have been canceled and new claims 12-18 have been added. Claims 12-18 are pending.

Response to Arguments

2. Applicant's arguments filed 1-15-2009 have been fully considered but they are not persuasive.

3. The Applicant argues at page 7 of the remarks that, Accordingly, Dudley does not disclose, or render obvious, either the "comparing" or "determining" steps as set forth in each of claims 12 and 14. Further, it should be noted that, when a sample to be measured has line *and* space patterns, a first derivative waveform obtained from such sample will not become the waveform as illustrated in Fig. 3A of Dudley. Applicants respectfully request that the rejection be withdrawn and the claims allowed.

The examiner disagrees.

First, it is important to point out that a charged particle scan over a pattern of lines and spaces produces the profile waveform with peaks 302, shown in applicant's Figure 3C below.

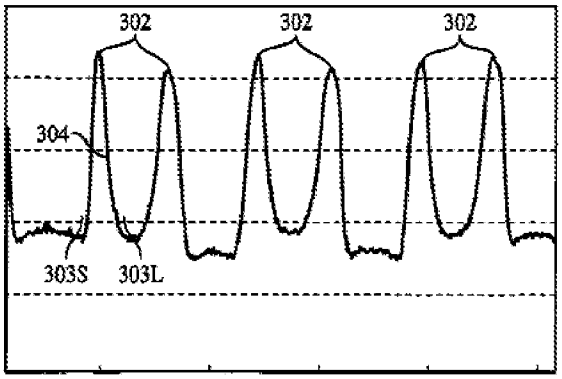


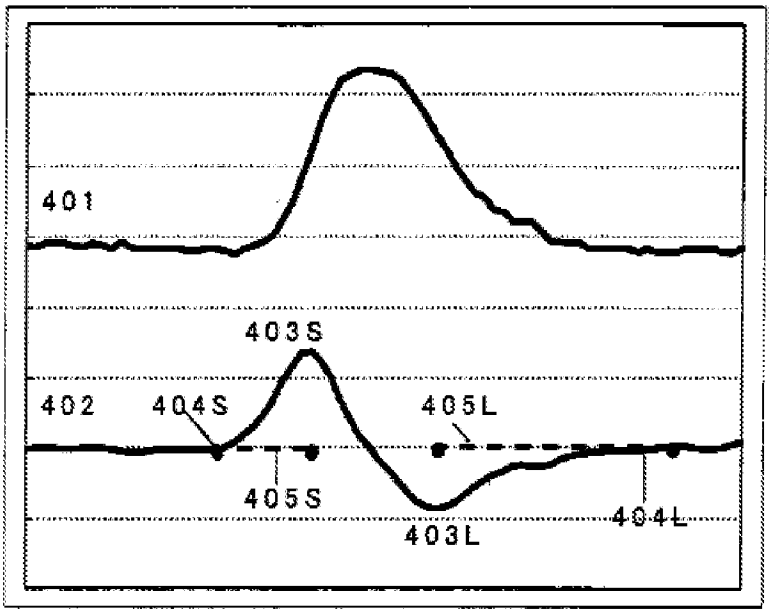
FIG. 3C

Each set of two profile peaks in the waveform define each "line" of the pattern, whereas each "space" in the pattern is defined by the region between the sets of two profile peaks 302. When the first derivative is performed on a set of two profile peaks 302 the resulting derivative waveform includes multiple peaks, at least one positive peak and one negative peak at the point where the rate of change for each of the individual profile peaks is the greatest.

Dudley discloses a derivative waveform of a profiled line structure at Col. 3, line 8-50, where distance values are compared to define the rate of change at multiple positions along pairs of positive and negative peaks of the derivative waveform. Dudley then performs a profile determining step by calculating the shape of the line structure defined by the pair of peaks. See also Col. 1, line 53-67; Col. 2, line 1-10 and Figure 3A.

Conversely, the applicant's specification fails to disclose determining a line pattern and a space pattern by comparing a pair of longer distances of a derivative waveform with a pair of shorter distances respectively of a derivative waveform. The applicant's disclosure only describes comparing single distances of a single derivative peak to define a line and space portion, as compared to Dudley's use of a pair of peaks.

For example at paragraph's [0037] to [0040] a derivative of a single peak 401 is shown below in Figure 4, where the derivative 402 includes one positive peak 403S and one negative peak 403L, and setting distances 405S and 405L to define the space and line portion of one edge of a line pattern respectively.



This section of the applicant's specification would not suggest to one of ordinary skill that, pairs of longer distance values or pairs of shorter distance values are used to define a line or a space.

In addition, the examiner has not been able to find any other part of the applicant's specification that states or suggests defining a line pattern with a pair of longer distances in a derivative waveform, nor has the examiner found any reference in the specification where a space pattern is defined by a pair of shorter distances in a derivative waveform.

In light of the above, the applicant's arguments that, the references fail to show the newly amended comparing and determining steps, is not supported by the specification and are therefore moot.

Objection

4. The amendment filed 1-15-2010 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states; that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: " determining, referring to a region between adjacent peak positions of said profile waveform, a region of the sample corresponding to a region of the derivative waveform having a pair of longer distances of the compared first and second distances of said derivative waveform to be the line pattern, and determining a region of the sample corresponding to a region of the derivative waveform having a pair of shorter distances of the compared first and second distances of said derivative waveform to be the space pattern. "

Applicant is required to cancel the new matter in the reply to this Office Action.

Claims Rejection – 35 U.S.C. 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 12, 14 and 15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contain subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Particular subject matter contained in claims 12, 14 and 15 includes the limitation, "determining, referring to a region between adjacent peak positions of said profile waveform, a

region of the sample corresponding to a region of the derivative waveform having a pair of longer distances of the compared first and second distances of said derivative waveform to be the line pattern, and determining a region of the sample corresponding to a region of the derivative waveform having a pair of shorter distances of the compared first and second distances of said derivative waveform to be the space pattern."

The examiner has found no reference in the specification to support the use of a pair of longer distances in the positive portions of a derivative waveform to define a line pattern, nor has the examiner found any reference in the specification where a space pattern is defined by a pair of shorter distances in the negative portions of a derivative waveform.

The applicant's disclosure (See paragraph's [0037]-[0040]) describes comparing a single longer distance with a single shorter distance in a derivative waveform of a single profile peak to define the line and space portions at only one edge region of a line pattern, and although the specification states at [0037] that this approach may be applied to all peaks in a waveform, there is no description as to how this is to be accomplished, nor would paragraph's [0037]-[0040] of the specification suggest that such an approach is intuitively obvious to one of ordinary skill in the art.

As a result, the examiner concludes that the specification does not contain clear, concise, and exact terms that would enable any person skilled in the art to make and use the now claimed invention.

Claims Rejection – 35 U.S.C. 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 6,627,887 to Dudley, in view of Archie, USPN 6,472,662.

8. Regarding claims 12 and 14, Dudley discloses at Col. 2, line 48-66, a method of using scanning electron microscope to scan a pattern that includesthe following steps;

(a) scanning a particle beam scanned over line structure 126 as shown in Figure 2 below. See Col. 2, line 64-66,

(b) forming a profile waveform, the dimensional waveform of structure 126. Col. 2, line 63-67 and Col. 3, line 1-7,

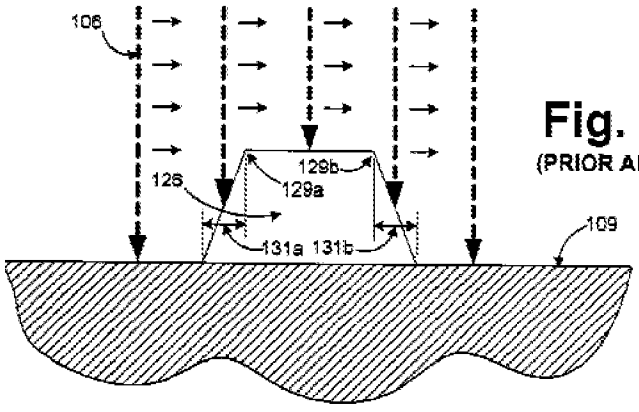


Fig. 2
(PRIOR ART)

(c) forming the derivative waveform shown in Figure 3A below of the dimensional waveform. Col. 3, line 8-15; and Col. 5, line 5-20,

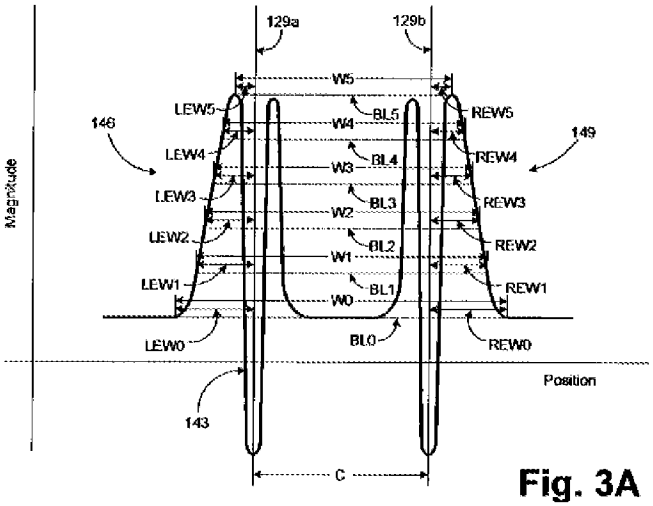
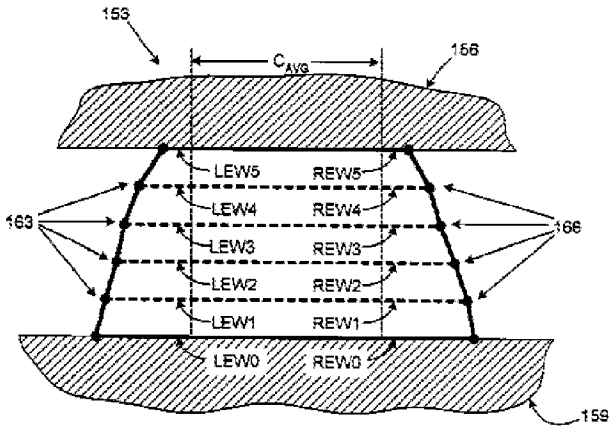


Fig. 3A

(d) comparing first longer distances LEW2-LEW5 (Figure 3A below) between the peak and foot of the outer edge of the left positive derivative peak 146 with second shorter distance LEW 5 of the negative derivative peak 143, which defines the transition 131a from the left foot to the top edge of the left profile peak 129a. Col. 3, line 16-50,

(e) determining the shape of structure 126 from the pairs of longer and shorter distances LEW1-5 and REW 1-5 in the derivative waveform as shown in Figure 3B below. Col. 3, line 63-67 and Col. 4, line 1-30.



Dudley fails to disclose scanning line and space patterns.

Archie discloses obtaining waveforms of SEM scans over line and space patterns Col. 1, line 44-55 and Col. 3, line 4-8

Archie modifies Dudley to provide waveforms of scanned line and space patterns, where the geometry of the pattern includes equal line and space widths. Col. 8, line 55-67 and Col. 9, line 1-5.

Dudley discloses scanning the patterned structure of an integrated circuit at Col. 1, line 57-67 and Col. 2, line 1-10.

Therefore it would have been obvious to one of ordinary skill at the time the invention was made that the scans of integrated circuit patterns of Dudley would include the line and space patterns of Archie.

9. Regarding claims 13 and 16, the combination of Dudley and Archie discloses the use of patterns having equal lines and spaces, as described above regarding claims 12 and 14.

10. Regarding claim 15, Dudley discloses referencing the pairs of longer and shorter distances LEW1-5 and REW 1-5 in the derivative waveform to baseline levels

at the base or feet of each pair of peaks, where the 0% baseline level is equivalent to a zero (flatline). Col. 3, line 16-25.

11. Regarding claims 17 and 18, Dudley fails to teach determining a target location for measurement of said sample based on the determined positions of said line and space patterns; however Dudley discloses use of a target structure and comparing measured profiles with a target profile. Col. 5, line 46-53. Dudley further teaches that the edges of the target structure are defined by coordinates at Col. 7, line 62-65 and col. 10, line 22-30.

One of ordinary skill in the art would recognize from the references above that samples are measured relative to the coordinate system location of the standard target of Dudley.

Therefore it would have been obvious to one of ordinary skill at the time the invention was made that the combination of Dudley and Archie teaches determining a target location for measuring the sample in accordance with the method described above regarding claims 12 and 14.

Conclusion

12. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 7:00 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor Robert Kim can be

reached at (571)272-2293. The fax phone number for the organization where the application or proceeding is assigned is 571 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ
February 14, 2010

/Phillip A Johnston/

Examiner, Art Unit 2881